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10/749,034

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EXAMINER

MOUTAOUAKIL, MOUNIR

ART UNIT

PAPER NUMBER

2619

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/749,034

Applicant(s)

GUERRERO ET AL.

Examiner

MOUNIR MOUTAOUKIL

Art Unit

2619

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SE/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. The amendment filed on 02-19-2008 has been entered and considered.
Claims 1-20 are pending in this application.
Claims 1-20 remain rejected as discussed below.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 3, 6-9, 13-15, and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Clarke et al (US 2004/0213284). Hereinafter referred to as Clarke.

Regarding claim 1. Clarke discloses a network device (200, fig 2B) that comprises a data plane (204, 214) for transmitting data between an ingress port and an egress port; and a control plane (processor 208 and memory 254) in communication with the data plane, the control plane includes a shared transmit/receive queue infrastructure configured to queue incoming multicast packets to be replicated on a per ingress port basis and to queue transmit packets (see figure 2B, see page 2, column [0023] where the processors function in a round robin fashion to process queued incoming multicast packets), and a multicast processing engine in communication with

the shared transmit/receive queue infrastructure (figure 2B, processor 208) the multicast processing engine including a circular replication buffer (see figure 2B. where the output buffer is a circular buffer) to facilitate multithreaded replication of multicast packets on a per egress virtual local area network (VLAN) replication basis (see figure 1. where multicast and frames are transmitted to and from VLAN networks).

Regarding claim 3. Clarke discloses a network device, in which the shared transmit/receive queue infrastructure dynamically allocates memory to the transmit packets (see page 3, paragraph 0025, where the transmit packets are stored within the buffer memory) and to the incoming multicast packets to be replicated (see page 3, paragraph 0025, frames are replicated depending on the headers information).

Regarding claim 6. Clarke discloses a network device, in which the control plane further includes a packet parser configured to input queue a multicast packet header in the shared transmit/receive queue infrastructure on a per ingress port basis (See page 2, paragraph 0019, the input buffer includes a packet parser).

Regarding claim 7. Clarke discloses a network device, in which the packet parser is further configured to de-queue a multicast packet from the shared transmit/receive queue infrastructure, the de-queued multicast packet corresponding to an ingress port as determined by the multicast processing engine (see page 2, paragraph 0022. the packet parsing is mainly arranged to de-queue multicast packet form the input buffer. The processing engine determines the de-queueing).

Regarding claims 8, 13 and 20. Clarke discloses a network device, in which the multicast-processing engine forwards a replicated multicast packet onto a main control

plane pipeline when traffic on the main control plane pipeline allows (see page 3, paragraph 0025. the replicated multicast packets are transmitted to the main pipeline whenever they are allowed depending on the flow).

Regarding claims 9 and 14. Clarke discloses a network device in which the control plane further includes a policer module configured to receive replicated multicast packet on the main control plane pipeline from the multicast processing engine (see paragraph 0024, where the system comprises a policer module), the main control plane pipeline containing at least one of unicast, layer 2 (L2), and multi-protocol label switching (MPLS) traffic (see paragraph 0016. where some of the data transmitted is MPLS traffic).

Regarding claim 15. Clarke discloses a computer program package embodied on a computer readable medium, the computer program package including instructions that, when executed by a processor (see page 1, paragraph 0012. the multicast processing system includes a computer readable medium), cause the processor to perform actions that comprises queuing incoming multicast packets to be replicated on a per ingress port basis in a shared transmit/receive queue infrastructure (figure 2B, the input buffer queues incoming multicast packets in order to be processed and replicated), the shared transmit/receive queue infrastructure being configured to queue the incoming multicast packets to be replicated and transmit packets (see figure 2B, the input buffer queues incoming multicast packets in order to be processed and replicated); determining an ingress port from which to de-queue multicast packets (see figure 2B, the input controller); de-queuing multicast packets from the shared

transmit/receive queue infrastructure (see page 2, paragraph 0023. where the processor de-queues the packets from the input buffer), the de-queued multicast packets being associated with the determined ingress port and placed into a replication buffer for replication (figure 2B, output buffer); and performing multithreaded replication of multicast packets on a per egress virtual local area network (VLAN) replication basis utilizing a replication buffer (figure 1, page 3 paragraphs 025-026).

Claim Rejections - 35 USC § 103

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2, 4, 5, 10-12, and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Clarke in view of Calamvokis et al (US 6,856,622). Hereinafter, referred to as Calamvokis.

Regarding claims 2, 11, 16 and 17. Clarke discloses all the limitations of claim 1.

Clarke does not disclose a network device, in which the multicast processing engine is configured to request multicast packets from the shared transmit/receive queue infrastructure upon emptying a slot in the circular replication buffer the requested multicast packet being from an ingress port determined based on a bandwidth management policy implemented by the multicast processing engine, and in which the multicast processing engine empties a slot in the circular replication buffer when all replications for the multicast packet occupying the slot are performed. However, Calamvokis discloses a cell scheduling protocol method in which the scheduler requests multicast packets from the ingress port as soon as the output circular buffer generate an empty slot (see figure1, elements 102A, 102B, and 106). Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to implement the method of multicast cell scheduling protocol, as taught by Calamvokis, into the multicast processing unit of Clarke for the purpose of facilitating the scheduling of the multicast packets and maintaining a high-quality data flow.

Regarding claims 4 and 18. Clarke discloses all the limitations of claim 1.

Clarke does not disclose a network device, in which the multicast processing engine includes a scheduler utilizing scheduling algorithms to dynamically adapt the rate at which multicast packets are de-queued for each ingress port as a function of how much output bandwidth each ingress port utilizes. However, Calamvokis discloses a cell scheduling protocol, in which the scheduler coordinates the de-queuing rates between the ingress and egress ports. Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to implement the method of multicast cell scheduling protocol, as taught by Calamvokis, into the multicast processing unit of Clarke for the purpose of facilitating the scheduling of the multicast packets and maintaining a high-quality data flow.

Regarding claims 5, 12 and 19. Clarke discloses a network device, in which plurality of threads of replication in the circular replication buffer are maintained (see page 3, paragraph 025-026).

Clarke does not disclose a scheduler that is configured to request multicast packets from the shared transmit/receive queue infrastructure. However, Calamvokis discloses a cell scheduling protocol, in which the scheduler coordinates the de-queuing rates between the ingress and egress ports. Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to implement the method of multicast cell scheduling protocol, as taught by Calamvokis, into the multicast processing unit of Clarke for the purpose of facilitating the scheduling of the multicast packets and maintaining a high-quality data flow.

Regarding claim 10. Clarke discloses a control plane multicast packet processing engine, that comprises a circular replication buffer for facilitating multithreaded replication (figure 2B, where the output buffer is a circular replication buffer for multicast replication) multicast packets on a per egress virtual local area network (VLAN) replication basis (figure 1. where multicast and frames are transmitted to and from VLAN networks).

Clarke does not disclose a network device, in which a scheduler is in communication with a shared transmit/receive queue infrastructure for queuing incoming multicast packets to be replicated on a per ingress port basis and for queuing transmit packets, the schedule being configured to de-queue multicast packets associated with the ingress ports into the circular replication buffer, the scheduler utilizing scheduling algorithms to dynamically adapt the rate at which the multicast packets are de-queued from each ingress port as a function of how much output bandwidth each ingress port utilizes (figure 1). However, Calamvokis discloses a cell scheduling protocol, in which the scheduler coordinates the de-queuing rates between the ingress and egress ports. Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to implement the method of multicast cell scheduling protocol, as taught by Calamvokis, into the multicast processing unit of Clarke for the purpose of facilitating the scheduling of the multicast packets and maintaining a high-quality data flow.

Response to Arguments

8. Applicant's arguments filed 02-19-2008 have been fully considered but they are not persuasive.

Applicants argue that the prior art of record does not teach "**a shared transmit/receive queue infrastructure** to queue incoming multicast packets ... and to queue transmit packets". Furthermore, applicants argue that the statement of a shared transmit/receive queue infrastructure means same queues are used for both incoming multicast packets and outgoing packets.

Examiner respectfully disagrees; the claim language does not specifically indicate that the queues are used for both receiving and transmitting packets, it only states a "shared infrastructure". Thus, it is believed that elements 204 and 212 are shared **infrastructure** to receive and transmit multicast packets. Moreover, it is the examiner's position to reject claims according to the broadest reasonable interpretation given to the claims. The claim language does not clearly state/indicate that a **queue** is used for queuing incoming packets and outgoing packets, neither the specification.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

When responding to this office action, applicants are advised to clearly point out the patentable novelty which they think the claims present in view of the state of the art disclosed by the references cited or the objections made. Applicants must also show how the amendments avoid such references or objections. See 37C.F.R 1.111(c). In addition, applicants are advised to provide the examiner with the line numbers and pages numbers in the application and/or references cited to assist examiner in locating the appropriate paragraphs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MOUNIR MOUTAOUKIL whose telephone number is (571)270-1416. The examiner can normally be reached on Monday-Thursday (1pm-4:30pm) eastern time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou can be reached on 571-272-3088. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MM
Mounir Moutaouakil
Patent Examiner
06-05-2008

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